Virginia Department of Mines, Minerals and Energy Issue 5 - September 1998

State Agency Energy Management Bulletin

Information for Agency Energy Managers and FASER Users at Virginia State Agencies

Utility Restructuring Workshop

Nearly one hundred procurement managers, agency energy managers and others attended an August 12 workshop on the deregulation of Virginia electric utilities, held at the Virginia Museum of Fine Arts.

John DePerro from the Department of Mental Health, Mental Retardation and Substance Abuse Services (DMHMRSAS) acted as master of ceremonies for this event, which was held to help prepare state agencies for deregulation of the electric industry in Virginia.

Following the welcome and the introduction of speakers, DePerro discussed the dollar values of electricity purchased by agencies – totaling more than $104 million last fiscal year.

Louis Monacell, of Christian & Barton, L.L.P., spoke about the legislative timetable for deregulation to become a reality in Virginia (see page 2). Monacell addressed state legislative actions, as well as the roles the State Corporation Commission and the federal government will play.

Horace Ford of the DMHMRSAS discussed the history of the **Interagency Procurement Cooperative** (IPC), and its directive in the *Virginia Energy Plan,* to "coordinate the least-cost purchase of natural gas and electricity for state agencies." Ford discussed the concept of a "center of excellence" in which one agency takes the lead in becoming the expert in the purchase of a commodity and then provides assistance to other agencies. The IPC has been actively involved in the bulk-purchase of natural gas for agencies, including the Department of Corrections, Western State Hospital, James Madison University and others. Agencies failed to respond to the deregulation of natural gas when it first came about eight years ago and lost out on a potential $5 million dollars in savings.

Steve Walz from the Department of Mines, Minerals and Energy (DMME) spoke about current electric service contracts for state agencies and the present system for the purchase of electricity. Walz focused his discussion on Virginia Power (which supplies electric power to the majority of Virginia state agencies) and also AEP.

Spencer Hall from Virginia Tech gave a lively talk on the history of how Virginia Tech went from being an electricity generator to a wholesale buyer and seller of electricity for the Town of Blacksburg.

After a networking lunch session, Virginia Power's John Larson talked about the new pricing systems expected in a deregulated environment, such as interruptible rates for electric power and the experimental real-time pricing currently in use by 50 industrial customers.

The remainder of the workshop dealt with what agencies can do now to prepare for deregulation in Virginia.

Tim Lake of Measuring and Monitoring Services, Inc., explained the role that metering and monitoring play in the purchase of electricity. Because past rate schedules have favored "master metering," few facility decision makers know enough details about the patterns of their facilities' electricity usage to make well-informed electricity purchasing decisions.

Ken Jurman from DMME announced the upgrade of the **FASER-9** energy monitoring software to **FASER 2000**. He also discussed other planned improvements in the operation of the state's energy monitoring program aimed at making it more useful for state agencies.

If you would like more information about electric deregulation or about the Interagency Procurement Cooperative, please contact John DePerro, at (804) 371-0306 or e-mail jdeperro@dmhmrsas.state.va.us. ❖

Did You Know...

Transformers are an important component of electric utility transmission and distribution systems. They are designed to reduce voltage to a level that can be used safely in homes and offices. Each year, more than two percent of U.S. electricity production is wasted due to transformer inefficiencies.

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Electric Restructuring in Virginia

House Bill 1172, passed in April of this year, establishes a schedule for Virginia's transition to retail competition in the sale of electricity. A summary of this schedule is as follows:

- The State Corporation Commission and entities with interests in electric generation and transmission facilities and the sale of electricity in Virginia, will work to establish independent system operators and regional power exchanges by January 1, 2001.
- The transition to retail competition and the deregulation of generation facilities will commence in Virginia on January 1, 2002.
- Retail competition, as defined and determined by the General Assembly, will commence in Virginia on January 1, 2004.

Although retail competition is still a few years away, it is not too early to begin preparing for impending changes to the electric utility industry in the Commonwealth. It will be important to have a good profile of usage and demand on hand to help choose the best energy provider for your facilities.

The right time to start collecting data on facility energy usage is **at least** one full year before sitting down with utility companies or energy marketers. This will allow you to consider the effects that seasonal variations and other variables have on your facility energy consumption before selecting the options that best suit your facilities' needs.

The full text of House Bill 1172 can be found on the **Virginia Legislative Information System** web site at http://leg1.state.va.us.❖

Energy Partnership 2000

The Virginia Energy Technology Industry Steering Committee, the Center for Innovative Technology (CIT), and Virginia Tech's Energy Management Institute (EMI) are hosting *Energy Technology Partnerships 2000*, a workshop to address how Virginia's energy technology businesses can grow into the new century. Representatives from industry, government, and academia are invited to an intensive and interactive two-day event to initiate multilevel partnerships and strengthen existing ones among the state businesses, investors, federal and state government agencies, and academic institutions.

Did You Know...

Cumulatively, we spend about $1 billion annually just to operate all the exit signs in buildings in the United States. By the year 2000, companies could be saving 800 million kilowatts of electricity per year through the use of ENERGY STAR compliant exit signs. That's a total savings of almost $70 million each year!

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Workshop topics include:

- Industry-government-academia partnerships;
- Energy technologies for manufacturing and their use;
- Emerging energy technologies;
- Financing energy technology businesses; and
- Restructuring and convergence of the utility industry.

The 1998 *Energy Technology Partnerships 2000* workshop will take place November 8-10, 1998 at the Hyatt Regency, in Reston, Virginia. For information on registration, contact the Conference Registrar, Division of Continuing Education, Virginia Tech, at (540) 231-5182 or check the workshop web site at http://www.conted.vt.edu/energy/technology.htm.❖

Building Integrated Photovoltaics

Photovoltaic (PV) panels generate electricity while absorbing solar radiation and reducing solar heat gain through the roof. A newly emerging Building Integrated PV (BIPV) technology is the use of PV roofing materials that can be installed much like traditional shingles or flat roof membranes, and involve little or no unusual engineering design.

Recently, buildings have incorporated PV cells mounted on clear building materials both to generate power and allow some light transmission through the panels to provide daylight to the space below. Such a system was installed at the Olympic Natatorium, built for the 1996 Olympic Games, at the Georgia Institute of Technology.

With PV materials becoming available for roofs and walls, as well as other products that allow through some visible light, a large proportion of a building's exterior surface area has the potential to provide power generation of approximately 0.5 to 1 kW peak

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Exit Sign Upgrades Easy and Profitable

Exit sign upgrades can potentially reduce energy and maintenance costs significantly. To replace up to 40 watts of incandescent power per exit sign, consider the following light sources:

Retrofit

- light-emitting diode (LED)
- electroluminescent
- low-wattage incandescent assembly
- compact fluorescent

New Exit Signs

- LED
- electroluminescent
- tritium or self-luminous
- compact fluorescent

Upgrade Applications • All emergency exit signs should illuminate 24 hours per day and continue operation in case of power failure. You can achieve significant energy savings by simply replacing or upgrading the exit signs with a low-energy model.

Common to all retrofit kits are adapters that screw into the existing incandescent sockets to make installation simple. However, to avoid snap-back, retrofit kits are available for hard-wire installation. Whatever connection methods you select, installation is easy, usually taking fifteen minutes or less per sign.

Of the retrofit options, light-emitting diode (LED) sources are the most cost-effective. Combined with the extremely long rated life of LED sources, this option is an economical retrofit based on life cycle cost. The LED retrofit consists of a pair of LED strips that follow the side panels of the exit sign enclosure. Reflective film or a diffusing panel is used to direct the LED output to the face of the sign.

Another low-cost retrofit solution is the incandescent assembly. A series of low-voltage, low-wattage, long-life incandescents are available in a variety of configurations (such as a luminous rope or cluster). These devices simply screw into the existing incandescent sockets.

Until recently, electroluminescent (EL) exit signs had only been available as replacement signs. Now you can upgrade your existing exit sign enclosures with EL panels that consume less than one watt!

Compact fluorescent lamps have been recommended for years as an energy-efficient retrofit for exit signs. However, the LED, EL, and low-wattage incandescent technologies discussed above exceed CFL life and efficacy.

Several choices exist for replacing exit signs. Among these choices, tritium or self-luminous sources are the most energy efficient, consuming no electricity. Note, however, that the spent tritium tubes must be disposed of as radioactive waste. Other new fixture

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EXIT SIGN TECHNOLOGIES TYPICAL PERFORMANCE

Source	Typical Wattage	Life (years)	Replacement Source	Annual Energy Cost ($)	Annual Maint. Cost ($)	Upgrade Cost ($)	NPV ($) per sign
New Fixtures							
Incandescent	40	0.8	lamp	28.00	19.50	N/A	N/A
CFL	10	2	lamp	7.00	9.5	116.00	296.00
Electroluminescent	1	10	light panel	0.70	20.50	190.00	166.00
Self Luminous (Tritium)	0	10-20	tube console	0	10.50	247.00	252.00
LED	5	80+	circuit board	3.50	0	116.00	466.00
Retrofit Light Sources							
Reduced Wattage Incandescent	8	10	light tube	5.60	4.00	30.00	467.00
CFL	10	1.2	lamp	7.00	9.50	30.00	377.00
LED	4	80+	LED kit	2.80	0	45.00	540.00

Assumptions

1. One-sided exit sign
2. Ten year life used for tritium signs
3. Maintenance costs based on materials and labor for source replacement on a spot relamping basis
4. $0.08 per kWh, labor = $15 per hour
5. Upgrade cost includes labor and materials
6. Financial analysis based on 20-yr life cycle with 3% inflation and discount rate of 12%

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choices include LED, electroluminescent, and compact fluorescent.

To select the most financially attractive exit sign upgrade, consider all of the costs that will occur during the life cycle, including installation, energy, maintenance, and disposal. The table on **page 3** compares new fixture and retrofit options to an incandescent base case.

Note that for new fixtures and retrofits, LED sources have the highest net present value (NPV). That is, LED retrofits can yield the most net profit. Use your specific financial assumptions to calculate the life-cycle net present value of replacing incandescents with an energy-efficient exit sign technology.

Reliability and Life • Check with local building codes for accepted emergency exit sign illuminance and retrofit sources. Verify that the exit sign illumination sources are UL-listed for use in your exit sign.

Reliability is important for exit signs. For example, sources with a shorter life are more likely to be burnt out when an emergency occurs. Of all the new technologies, LED sources have the longest rated life. Most claims state that LED sources will last 80 years, although some reports have rated their life at more than 100 years. Self-luminous and electroluminescent sources also have long life spans. The table on **page 3** also identifies the expected life of each technology.

Note that the light output of electroluminescent light sources depreciates significantly over time. You should request information about the lumen depreciation performance of the electroluminescent product that you are considering, and evaluate whether the maintained light output will be acceptable.

Since tritium is radioactive, expired tritium tubes must be disposed of as radioactive waste. To insure proper disposal of the luminous tubes, manufacturers will specify an address on the tube console, indicating where to send it for disposal.❖

FASER 2000 Upgrade in the Works

The Division of Energy is negotiating with Omnicomp, Inc., for the purchase of their FASER 2000 energy monitoring software and related services. FASER 2000 has been chosen to replace the DOS-based FASER-9 software in use at state agencies since 1993.

FASER 2000 will best meet the energy monitoring needs of state agencies, as well as the Division of Energy's needs for compiling statewide energy cost and consumption data.

DMME appreciates the assistance agencies provided that helped guide this decision, and we look forward to working with agencies in the coming months to help set up this new software and provide necessary training. We will keep FASER users informed on the status of the procurement as it progresses.

If you have questions or comments, or would like to receive a copy of the energy monitoring survey results, please contact Ken Jurman at (804) 692-3222, or e-mail ksj@mme.state.va.us.❖

Energy Efficiency Grants Awarded to Virginia Schools

DMME recently awarded energy efficiency matching grants to 21 state educational institutions for a wide range of projects which will include energy efficient boilers, lighting upgrades, and energy management control systems. The educational institutions will share $650,000 in state and federal grant funds. The localities of the participating schools will provide a total of $770,264 in matching funds for the projects.

The matching grants for the projects will reduce the operating costs of school facilities and demonstrate applications of the latest energy efficient lighting and HVAC equipment. When completed, the projects are projected to save $372,488 annually in reduced energy costs. This represents an average simple payback term of 3.8 years based on the $1.4 million investment.

For more information, please contact Vernon Banks at (804) 693-2227 or e-mail vwb@mme.state.va.us.❖

Did You Know...

In the average office, computers that are turned on are only used for four hours a day. Additionally, 25 percent of computers are left running at night and on weekends. When left on all of the time, energy consumption for a single workstation can total 2,500 kWh per year or from $125 to $250, depending on your utility rates.

U.S. EPA

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for every 10 square meters, depending on construction and orientation. In addition to reducing solar heat gain through the shell, BIPV technologies offer the advantage of providing the greatest power generation capacity coincident with the time of day when space cooling needs are greatest.❖

Building Control Tune-Ups Offer Considerable Savings

The energy management system and controls within a building play a crucial role in providing a comfortable building environment. Over time, temperature sensors or thermostats often become out of tune. Wall thermostats are frequently adjusted by occupants, throwing off controls and causing unintended energy consumption within a building.

Poorly calibrated sensors can increase heating and cooling loads and cause occupant discomfort. As with envelope infiltration problems, occupants are likely to take matters into their own hands if they are consistently experiencing heating or cooling problems. By integrating mechanical and control tune-ups within each system, you are more likely to improve occupant comfort.

Tune-up • The first step in tuning up controls is to calibrate the indoor and outdoor building sensors. Calibration of room thermostats, duct thermostats, humidistats, and pressure and temperature sensors should be in accordance with the original design specifications. Calibrating these controls may require specialized skills or equipment, such as computer software. Thus, you should seriously consider the use of outside expertise for this tune-up.

In addition to calibrating the sensors, damper and valve controls should be inspected to make sure they are functioning properly. Check pneumatically controlled dampers for compressed air leaks in the hosing. Also examine them to ensure that they open and close properly. Stiff dampers can cause improper modulation of the amount of outside air being used in the supply air stream. In some cases, dampers can actually be wired in position or disconnected entirely, violating minimum outside air.

As part of tuning up controls, be sure to review building operating schedules. Often, while control schedules remain constant, occupancy schedules change frequently over the life of a building. This may result in discomfort or waste at the beginning and end of each day. HVAC controls must be adjusted to heat and cool the building properly during occupied hours. For example, operating schedules should be adjusted to reflect Daylight Savings Time.

When the building is unoccupied, set the temperature back to save some heating or cooling energy. Keep in mind that some minimum heating and cooling may be required when the building is unoccupied. In cold seasons, for example, heating may be needed to keep water pipes from freezing.

Considerations

- Are building sensors, such as thermostats and humidistats, calibrated and operating properly?
- Are damper and valve controls functioning properly?
- Are there no leaks present in the pneumatic control systems?
- Do equipment schedules reflect occupancy schedules and seasonal changes?
- Can certain equipment be scheduled to operate during utility off-peak hours?
- Can temperatures be set back during unoccupied times?

Savings • The main savings associated with tuning controls result from reductions in charges for heating and cooling energy (and possibly electrical demand). Because savings are heavily dependent on the existing condition of the controls, it is difficult to estimate the actual savings that will result from a tune-up. Savings will depend on many factors related to the building including heating and cooling system types; construction; geographical location; and internal heating, cooling, and electrical loads. Heating and cooling cost savings can range up to 30%.❖

Ridefinders Recognize those who "Made a Difference" in Richmond Air Quality

Employee Transportation Coordinators from the greater Richmond area were invited to attend a September 16 awards luncheon aboard the riverboat Annabel Lee.

Sponsored by Richmond Ridefinders, the awards luncheon was held to recognize those who, according to Ridefinders, went "over and beyond" in their efforts to promote commuting options and ways to positively impact Richmond area air quality. Volunteer

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Employee Transportation Coordinators from several Richmond area businesses and state agencies were among the award recipients. These individuals were awarded plaques, gift certificates for local merchants and restaurants, or tickets to a performance at the Landmark Theater in Richmond. State agency award recipients include:

- **Theresita Pleasants-Lewis** of the Department of Military Affairs, for her work with Ridefinders to conduct an employee transportation survey in preparation for pending relocation of Military Affairs later this year.
- **Carolyn Elliott** of Chesapeake Bay Local Assistance Authority, who registered 25% of their employees in the Ridefinders program. Carolyn won the full support of upper management to develop an internal plan and policy handbook as one of the strategies in their agency energy management plan.
- **Jay Gutshall** of the Department of Environmental Quality, for establishing a "one stop shop" for ride sharing and air quality information, GRTC bus tickets, transit vouchers, and parking passes. The department also subsidizes $20 per month for employees who ride the bus or in vanpools.
- **Pam Gillespie** of the State Corporation Commission, who recently administered an employee transportation survey and registered 86 new clients with Ridefinders. Pam also checks the DEQ web site daily for the ozone forecast, and has distributed Ozone Action Days flyers to over 400 employees. The State Corporation Commission has established a preferential parking system for car-poolers.

We would like to congratulate these award recipients and **all** of the Employee Transportation Coordinators in Virginia who volunteer their time to help improve transportation energy efficiency. Keep up the great work!❖

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***Agency Energy Managers*:**
Please file this Bulletin in Section 10 of your *Agency Energy Management Resource Guide*